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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,438	04/05/2004	Akito Sato	Q80942	1293

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

GOLDBERG, BRIAN J

ART UNIT	PAPER NUMBER
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2861

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/817,438	Applicant(s) SATO ET AL.	
	Examiner Brian Goldberg	Art Unit 2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9, 12, 17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9, 12, 17 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 18 is objected to because of the following informalities: the limitation "each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row" is not clear. A suggested correction is to change the limitation to "each of all the nozzles making up said second nozzle row is aligned in a sub-scanning direction with one of the nozzles making up said first nozzle row." Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 9 and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is not evident from the specification or drawings that both a number per unit area of droplets of the ink not having color material is less than a number per unit area of droplets of the ink having color material and each of the nozzle rows are misaligned with each other in a sub-scanning direction by a fixed distance; nor that both a number of nozzles making up the second nozzle row is less than a number of nozzles making up the first nozzle row and each of the nozzle

rows are misaligned with each other in a sub-scanning direction by a fixed distance. Only in figure 15B, and its accompanying description in the specification, is it shown that the two nozzle rows are misaligned in the sub-scanning direction. While being misaligned by a fixed distance is not specifically disclosed, one can assume from the figure that this is the case. However, figure 15B does not show that the number of nozzles making up the second nozzle row is less than the number of nozzles making up the first nozzle row, nor does it show a number per unit area of droplets of the ink not having color material is less than a number per unit area of droplets of the ink having color material. Essentially, each of the limitations is disclosed in separate embodiments, but they do not appear to be disclosed combined in a single embodiment as claimed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa (US 6371609) in view of Tajika et al. (US 6120141).

2. Regarding claim 9, Oikawa disclose "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a

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second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance."

3. Tajika et al. teaches "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance (see Fig 21 in which due to the alignment in rows in the sub-scanning direction, each row of nozzles is misaligned in the sub-scanning direction with any of the other rows of nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami (US 6601945) and further in view of Tajika et al.

5. Regarding claim 12, Oikawa discloses "a first nozzle row for ejecting ink having color material (30 b of Fig 3A); and a second nozzle row for ejecting ink not having color material (30a of Fig 3A)." Thus Oikawa meets the claimed invention except "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row; and wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance."

6. Kitakami teaches "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row (Fig 6A and 6B, wherein there are 240 color ink nozzles and 16 non-color ink nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the number of nozzles ejecting non-color ink be less than the number of nozzles ejecting color ink. One would have been motivated to so modify Oikawa for the benefit of reducing the total number of nozzles making the head smaller, while also conserving the non-color ink, which makes the printing apparatus more efficient.

7. Tajika et al. teaches "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance (see Fig 21 in which due to the alignment in rows in the sub-scanning

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direction, each row of nozzles is misaligned in the sub-scanning direction with any of the other rows of nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Shibata et al. (US 6779865).

9. Regarding claim 9, Oikawa disclose "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance."

10. Shibata et al. teaches "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a

manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance (see Fig 2 in which the nozzle row on the right of 21-2 is misaligned with the nozzle row on the left of 21-3 and col 4 ln 62 – col 5 ln 2).” It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami and further in view of Shibata et al.

12. Regarding claim 12, Oikawa discloses “a first nozzle row for ejecting ink having color material (30 b of Fig 3A); and a second nozzle row for ejecting ink not having color material (30a of Fig 3A).” Thus Oikawa meets the claimed invention except “wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row; and wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance.”

13. Kitakami teaches “wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row (Fig 6A and 6B,

wherein there are 240 color ink nozzles and 16 non-color ink nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the number of nozzles ejecting non-color ink be less than the number of nozzles ejecting color ink. One would have been motivated to so modify Oikawa for the benefit of reducing the total number of nozzles making the head smaller, while also conserving the non-color ink, which makes the printing apparatus more efficient.

14. Shibata et al. teaches "wherein the first nozzle row and the second nozzle row are misaligned with each other in a sub-scanning direction by a fixed distance in such a manner that the nozzles making up the first nozzle row are misaligned, respectively, in the sub-scanning direction from the nozzles making up the second nozzle row by the fixed distance (see Fig 2 in which the nozzle row on the right of 21-2 is misaligned with the nozzle row on the left of 21-3 and col 4 ln 62 – col 5 ln 2)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

15. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kanda et al. (US 6471322).

16. Regarding claim 17, Oikawa discloses "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a

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second nozzle row for ejecting ink not having color material nor black material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row.” Thus Oikawa meets the claimed invention except “wherein each of all of the nozzles making up said second nozzle row is arranged such that all the nozzles making up said second nozzle row are arranged at a constant pitch, and said constant pitch is larger than a pitch at which the nozzles making up said first nozzle row are arranged.”

17. Kanda et al. teaches “wherein each of all of the nozzles making up said second nozzle row is arranged such that all the nozzles making up said second nozzle row are arranged at a constant pitch (see first recording head of Fig 4), and said constant pitch is larger than a pitch at which the nozzles making up said first nozzle row are arranged (see Fig 4 and Fig 5, with first nozzle row pitch of 1/1200 inches and second nozzle row pitch of 1/600 inches).” It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the constant nozzle pitch of the second row be greater than the constant pitch of the first row. One would have been motivated to so modify Oikawa for the benefit of being able to record at high resolution without reducing recording speed as stated by Kanda et al.

18. Regarding claim 18, Oikawa discloses “a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a

second nozzle row for ejecting ink not having color material nor black material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein each of all of the nozzles making up said second nozzle row is arranged such that each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row, and a spacing between adjacent nozzles making up said second nozzle row is larger than a spacing between adjacent nozzles making up said first nozzle row."

19. Kanda et al. teaches "wherein each of all of the nozzles making up said second nozzle row is arranged such that each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row (see Fig 5 in which all of the nozzles in the second nozzle row for ink not having color material (black) are aligned in a sub-scanning direction with all of the nozzle in the first nozzle row), and a spacing between adjacent nozzles making up said second nozzle row is larger than a spacing between adjacent nozzles making up said first nozzle row (see Fig 5 with first nozzle row spacing of 1/1200 inches and second nozzle row spacing of 1/600 inches)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the nozzle spacing of the second row be greater than the spacing of the first row with the nozzles of the second row aligned in a sub-scanning direction with nozzles of the first row. One would

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have been motivated to so modify Oikawa for the benefit of being able to record at high resolution without reducing recording speed as stated by Kanda et al.

Response to Arguments

20. Applicant's arguments filed 11/30/06 have been fully considered but they are not persuasive. Regarding claims 9 and 12, it is common in the art to have nozzle rows misaligned with each other in the sub-scanning direction, as shown by the two references cited above. Regarding claims 17 and 18, the cited reference does disclose a second nozzle row (S of Fig 3A) that ejects ink not having color material nor black material. Furthermore, applicant's arguments amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Goldberg whose telephone number is 571-272-2728. The examiner can normally be reached on Monday through Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Brian Goldberg
AU 2861
January 19, 2007



STEPHEN MEIER
SUPERVISORY PATENT EXAMINER